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ABSTRACT

The broad use of maps by non-cartographers imposes on the cartographer the burden to make maps not only accurate, but to use symbols which make map-reading easier for the public. The latter requirement implies a need for universal symbols. Although there are no universal symbols today (letters, words, and figures, to a lesser extent, are dependent for their meaning on the symbology of particular cultures), there are favorable factors which could make cartography a first in the development of truly universal graphic symbols. There are three major categories of graphic symbols: pictographic, concept-related, and arbitrary symbols. Official Canadian and U.S. maps, among others, have all three symbol types represented. In order to remove this complexity and make progress toward universal symbols, at least two actions will be required: 1) agreement among the professional and governmental organizations concerned with symbols of a given country as to what symbols are currently in use, and which of these are primary candidates for standardization, and 2) organization of a permanent international agency for the development of universal symbols, perhaps as an expansion of the existing International Standards Organization. (JLB)

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UNIVERSAL SYMBOLS AND CARTOGRAPHY

Rudolf Modley
September 9, 1970

Symposium on the Influence of the Map User on Map Design.
Queen's University, Kingston, Ont.

1. There are no universal symbols today.

My subject today is "Universal Symbols and Cartography". To be perfectly candid, there are no such things as universal symbols today. With this statement, I might just as well sit down and save you - and myself - time and trouble. But I am not going to make it that easy on you and on me. That is so, because I think that there are some favorable factors which could make cartography a first in the development of truly universal graphic symbols.

But to lead you to that conclusion, you'll first have to join me in a rather complex journey into symbology. From this, I hope we can learn what to expect and what not to expect from graphic symbols in world-wide map use.

Symbols are all-pervading. As I talk to you here, I am talking in symbols. Because the words I am using are symbols, they are not the "real thing". The word "map", for instance, is not a map. It is just a symbol which people in our culture and language group have accepted to mean a certain thing. And while I hope that all of you here understand what I am saying, the word symbols which I am using are far from "universal". They are merely English word symbols - and there are 3,000 other languages spoken in the world today. If all the people of the world were listening to this speech, only one out of ten could understand the language I am speaking.

We have been told that a summary of this talk may be published in the "Canadian Cartographer". This, again, will mean that some of the words I am speaking now may be converted into other symbols made up of the letters of our alphabet. These letters, in turn, are mere sound symbols. Out of the 26 sound symbols which we are using, you can construct hundreds of thousands of words in the English language alone. But these same sound symbols are being used by other people to write their language: German, French, Dutch, Spanish, and others. But even

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our Roman alphabet is far from "universal" - the majority of mankind uses other characters for writing: Cyrillic, Chinese, Greek, Hebrew, Arabic, Devangari, etc. Thus, the words on Canadian, U.S., and British maps cannot be read by all people, and many of those which can read them will often not understand anything but the location names.

Things are a bit better when we come to numerals. While there may be some confusion if the figures mean kilometers or miles, meters or feet, etc., more people can "read" the Hindu-Arabic numerals than can read the Roman letters or the English language. But, as anybody who has traveled in Asia knows, even numerals take on different forms in different cultures.

This short trip through the most common forms of communication should prove the point with which I started - namely, that there are no such things as universal symbols today.

2. All symbols have to be learned.

Let us stay with words, letters, and figures for a while longer. It will help us later when we discuss map symbols.

First, let us all agree that ALL symbols have to be learned. While speaking, writing, reading, and figuring seems to come to us adults "naturally", this is so only because we have been made to learn the alphabet, the basic numerals, the mathematical operators and the punctuation marks by rote at an early age. All of these symbols had to be learned; none of them is self-explanatory except, possibly, the Hindu-Arabic numeral "1" when written (but not when spoken). Thus, the fifty-or-so basic symbols of communication have to be learned, as well as the thousands of words which can be formed by them. Just how staggering this learning load is becomes clear to us when we try to learn another language. When the new language uses a different alphabet (as do Russian and Greek) or has thousands of different characters (as does Chinese or Japanese) the problem becomes overwhelming.

It is, therefore, easy to understand that efforts have been made to create a single alphabet and a single world language.

It would be pleasant to say that we seem to be on the way toward one universal way of spelling, speaking, and writing - but I don't think we are going in this direction. As a matter of fact, the Irish and the Israeli experience points the other way.

However, there are efforts, experiments, and a few reports on limited progress in limited fields - but there isn't much to crow about.

There is an international phonetic alphabet but it is used primarily by experts and in dictionaries for the proper determination of sounds.

There are efforts to create world languages - either full-fledged artificial languages such as Esperanto or auxiliary languages such as Basic English. None has taken a hold.

Only in the field of numbers do we find a growing acceptance of the so-called Hindu-Arabic numerals because of their clear superiority over other counting units - such as, e.g., the Roman numerals.

Let us now turn to graphic symbols in general.

3. What kinds of graphic symbols are there?

We can divide all graphic symbols into three major groups:

1. Image-related symbols (pictographs):

These resemble the real object to some degree of "fidelity". A symbol for an "exposed wreck"

(Illustration 1)

might be the bow of a ship sticking out of the water. Or a marsh or swamp

(Illustration 2)

may be shown by tufts of grass.

Image-related symbols have the great advantage of being easily recognized, easily taught, easily learned

and easily retained. They would be ideal candidates for "universal symbols" if it weren't for two problems: the first is that only natural objects tend to remain unchanged in time. A cow, grass, or a tree look the same today as they did hundred years ago. But technical innovation and different cultural traits tend to change other objects. Many image-related symbols have become relics which are either unrecognized as the sugar loaf and the butter churn

(Illustration 3)

or begin to look a bit silly although they may still be called "international symbols" in some areas - as are these car and train symbols which you may find in Europe.

(Illustration 4)

The other problem with image-related symbols is that the ease with which they are drawn leads many draftsmen into "designing" their own versions of such symbols so that many agencies have many different types of the same "image-related" symbols.

2. Concept-related symbols.

By "concept-related" symbols I mean such symbols as the horizontal wave for water and the vertical wave for smoke or fire

(Illustration 5)

the directional arrow

(Illustration 6)

and possibly some image-related symbols which are or may have had to do with tools or activities of a profession such as the pick axe and the shovel for mines and gravel pits

(Illustration 7)

may also belong here. Here, too, we may put some of the cartographer's symbols for railroads and roads and his school and church symbols. While these symbols do

not reproduce the visual image of the "real thing", they are close to the idea which we connect with this thing or activity.

On the whole, these symbols tend to have a shorter life than the image-related symbols for natural things but a longer life than the image-related symbols for objects which are likely to undergo changes because of custom or technology.

Because they somehow conform to our concepts of the things or ideas portrayed by them, these symbols are easier to teach, and, once learned, they are likely to be easily recognized and retained.

3. Arbitrary symbols.

Finally, we have "arbitrary symbols" which have no visual relation to an object or an idea. Because of this, such symbols are more difficult to teach, more difficult to learn and harder to retain and recognize - unless learned by rote.

It may be surprising to realize that our letters and numerals and all the other basic graphic symbols in common use in our civilization are arbitrary symbols. Some have developed over centuries, some over thousands of years, mostly after competition with other symbols. But the important fact to note is that it is not the "easy" image-related symbol which survives but the harder-to-learn arbitrary symbol.

On the other hand, most arbitrary symbols which are not universally taught at an early age or limited to a controlled group of scientists or professionals are rarely successful.

4. Symbols and Cartographers.

And now, finally, we are ready to go more fully into our specific subject. I think the ground is now well prepared so that we should be able to advance rather quickly.

Geographers and cartographers are professionals. Like other professionals, they mostly talk to each other. For this, many professional groups develop their own jargon and their own symbol language. Chemists and mathematicians,

electronics engineers and plumbers use technical terms and "standard" symbols which only they can understand.

Cartographers, too, tend to talk a jargon of their own; they talk of negative scribing, of gravers and blades and orthophotomaps and many other things which we laymen do not understand. But, and there is a critical difference, the end products of the cartographer's job are most often maps which non-cartographers have to use. Most maps are used by the general public although many are, of course, used by specialists.

The broad use of maps by non-cartographers imposes on the cartographer the burden to make maps not only accurate but to use symbols which, by their shape, size, location, and color make the reading of maps easy for the general public.

Speaking only of the maps which are of the type produced by official Canadian, U.S., and similar mapping agencies, we meet all the symbol types discussed previously.

For instance, in the U.S. Geological Survey maps we find topographic symbols which are image-related (exposed wreck, route markers, rice fields, etc., blue for water, green for woods), concept-related (bridges, overpasses, churches, schools, directional arrows, etc.) and arbitrary symbols (contour lines, rocks, borders, etc.).

There is a heavy preponderance of image- and concept-related symbols which makes them comparatively easy to recognize and remember. Being directed to a large extent to the general public, cartographic symbols should be logical candidates for universal symbols.

Let us, therefore, discuss what it might take to move in this direction.

5. The road to universal symbols.

The road to universal symbols seems difficult. It is so because the factors which will determine success or failure are not only questions of quality and technical competence but are also questions of politics and of organization.

Let me briefly outline what I think will be required to make progress towards universal symbols.

1. Agreement among the professional and governmental organizations concerned with symbols of a given country as to what symbols are currently in use - and which of these symbols are primary candidates for standardization. The number of such symbols should be limited and include only those intended for general public use. The national work could be carried on under the leadership of existing private or governmental agencies. Institutions such as the National Science Foundation, the country's standard institute, the Office of Management and Budget (through an expansion of the Office of Statistical Standards) and others might be considered.

- The preparatory work for each special field could well be done by task forces of specialists - cartographers, public road experts, meteorologists, medical experts, etc. through their professional organizations.

- Coordination would then be carried on by the national coordinating group. Let me mention only one point which will surely require coordination of the type which I have in mind: there are road signs or "traffic control devices" for bridges, schools, hospitals, railroads, and many types of roads. These may, or may not, be identical or similar to the symbols used by cartographers. Wouldn't it be more logical to develop identical symbols for identical meanings for the identical people who use maps and also travel on highways?

- The national agency would most probably want to set up an archive of the symbols in use in the country and in other countries so as to be fully aware of what symbols are in actual use, what their meaning is, the extent of usage, etc.

- The agency would also have to play an active role in finding out what makes symbols "tick". There would probably have to be an advisory group composed of scientists and practitioners from different disciplines concerned with all aspects of the learning process and familiar with the

process of diffusion of new modes of communication on different cultural levels.

2. Organization of a permanent international agency for the development of universal symbols. This might be accomplished through an expansion of the functions of the existing International Standards Organization in Geneva. Naturally, your own International Cartographic Association would have a major role to play in the work of the ISO.

ISO, if it were charged with the task, would cooperate with the governments and professional agencies of the countries concerned.

This is not the time and the place to go into any more detail. I have given you only a glimpse at the complexity of the prospects.

Glyphs, Inc., the little organization of which I am co-chairman with anthropologist Margaret Mead, has set itself the task of promoting universal symbols. Our objective is the development of a limited number of universal symbols which, we hope, would become part and parcel of the basic symbol structure taught all over the world. Our first practical step, which we hope to accomplish soon, will be the establishment of an international symbol archive in New York - possibly with duplicate archives in Europe and Asia.

I hope I have given you a factual account of the problem and of the roads which might lead to a solution.

SELECTED BIBLIOGRAPHY on UNIVERSAL SYMBOLS.

American Standards Association (later called USASI and ANSI), "American Standards" for graphical symbols in many different fields such as "Welding", "Plumbing", Railroad Maps", etc.

Bliss, C. K., "Semantography", Sidney, 1965. An ingenious but rather "way out" attempt at a written universal language.

Cajori, C. K., "A History of Mathematical Notations," Chicago, 1957. A scholarly two-volume study.

Dreyfuss, H., "Case Study: Symbols for Industrial Use", in "Sign, Image, Symbol", (Kepes, G., Ed.) New York, 1966.

Frank, L. K., "The World as a Communication Network", in "Sign, Image, Symbol,"(Kepes, G., Ed.) New York, 1966.

Froshaug, A. "Roadside Traffic Signs", Design 178, London 1963. A graphic survey of different proposals for road signs.

Gibson, J. J., "Perception of the Visual World", Boston, 1950. A pioneering work in the field of perception.

Glyphs, Inc., Newsletter. Two issues since 1966. The third issue is scheduled to be published in Tokyo, 1970.

Helfman, E. S., "Signs and Symbols around the World", New York, 1967. A good book, planned primarily for high school students.

Hogben, L., "From Cave Painting to Comic Strip", New York, 1949. A history of Human communication; illustrations selected by Marie Neurath.

International Committee on Travel Signs and Symbols. Draft reports and working papers with a collection of symbols. Paris, 1967 and 1969.

International Society for the Study of Symbols, "International Journal of Symbology", Three issues since 1969, with some items on graphic symbols.

Kato, S., "Towards an International Symbol Language", Print, New York, March-April 1967.

Katzumie, M., "Toward an International Sign Language". A paper presented at the ICOGRADA meeting in Bled, Yugoslavia, 1966.

Kepes, G. (Ed.), "Sign, Image, Symbol". A worthwhile volume in the "Vision and Value" series with contributions by L. K. Frank, Rudolf Arnheim, S. Giedion, Rudolf Modley, Henry Dreyfuss and others.

Koberstein, H., "Wiener Methode der Bildstatistik". Bremen, 1969. A thorough study of the pictograph method and its founder, Otto Neurath.

Krampen, M., "Signs and Symbols in Graphic Communication". Design Quarterly 62, Minneapolis, 1965.

Maldonado, T., Bonsiepe, G. and Müller, W., "Notes on Communication and Sign System Design for Operative Communication", Uppercase 5, London, 1961. The issue also contains some designs for computer symbols.

Mead, M. and Modley, R., "Communication among all People Everywhere", Natural History, New York, Aug.-Sept.1968.

Menninger, K., "Zahlwort und Ziffer", Göttingen 1958. (Also published in the U.S. as "Number Words and Number Symbols", Cambridge, 1970.) A fascinating but difficult cultural history of numbers.

Modley, R., "Graphic Symbols for Worldwide Communication". "Sign, Image, Symbol". (Kepes, G., Ed.) New York,1966.

Neurath, Otto, "International Picture Language". A small book by the founder of the pictograph method. London, 1936.

Olson, E. C., and Whitmarsh, A., "Foreign Maps", New York, 1944.

Otreba, R., "Selected Information Values of Signs based on Static Road Signs", Cracow, 1966.

Print, "International Signs and Symbols, Special ICOGRADA issue", New York, Nov.-Dec. 1969. Probably the best introduction into the hopes and problems of universal signs. Edited by Peter Kneebone who heads the Commission on International Signs and Symbols of the International Council of Graphic Design Associations.

"Symbolon", Jahrbuch für Symbolforschung. Six volumes since 1960. Basel. Closer to religious and mythological symbology than to the problems of the geographer.

United States. Many agencies of the U.S. government publish items of interest, especially the U.S. Geological Survey and the Army Map Service. There are also several field manuals on U.S. military symbols and on the typographic symbols of other countries.

Whitney, E. (Ed.), "Symbology", New York, 1960. The use of symbols in visual communications, with contributions by Frank C. Laubach, Frank Stanton, William G. Eliot, 3rd, and Rudolf Modley.